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AUTHOR Nelson, Miles A.; And Others
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ABSTRACT

The purpose of this study was to develop paradigms of verbal interaction for problem solving discussions. Taking selected definitions from previously published work, categories were built which classify verbal moves. Using the categories, models of verbal interaction were built which subsumed such verbal interaction concepts as the venture, move, cycle, and module, defined in other research studies. These models served to define clearly interaction terms like lecture, teacher-centered discussion, and student-centered discussion. When coupled with the Classroom Observational Record developed by Reynolds, Abraham, and Nelson, these paradigms become powerful tools for conceptualizing and researching classroom interaction. (Author)

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Discussion Paradigms

by

Miles A. Nelson
University of Wisconsin, Madison

William W. Reynolds Jr.
University of Pennsylvania, Philadelphia

Eugene C. Abraham
Temple University, Philadelphia

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Miles A. Nelson

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Eugene C. Abraham

The development of people who think is the goal of education according to the Educational Policies Commission (1966). The Commission describes the characteristics of thinking people as:

1. Longing to know and to understand;
2. Questioning of all things;
3. Search for data and their meaning;
4. Demand for verification;
5. Respect for logic;
6. Consideration of premises;
7. Consideration of consequences.

A careful study of these characteristics reveals that most are skills which must be practiced in order to be developed. Since a large part of classroom learning is done via verbal exchanges of information, ways need to be developed which provide opportunities to practice these skills during verbal exchanges, and to conceptualize these interchanges so that they may easily be incorporated by preservice and practicing teachers.

Theoretical Framework

In order to investigate verbal interchanges and their effect on classroom learning in a systematic fashion, some

paradigms are needed. As Gage (1963) points out, paradigms are "models, patterns or schemata;" they are useful ways of thinking which, if researched, will lead to the development of a theory. After reviewing many paradigms for the teaching process, Gage notes that none "has come to grips with the complication that teachers typically deal with more than one pupil at a time." He further comments:

> that the unit of interchange connoted by these paradigms is a "small" one, a single "interact" analogous to only one complete passage of the tennis ball back and forth across the net. In getting one's opponent out of position, or playing to his weak side, often consist of more than one exchange. (Gage, 1963, p. 129)

A basic unit of verbal interaction is necessary to develop a paradigm. Every researcher has picked out some phase of verbal interaction as a unit, depending on his particular research. Smith and Meux (1962) have chosen two basic units, the episode and the monologue. The former is defined as one, or more, exchange(s) which comprise a completed verbal transaction between two or more speakers. A new episode is determined by a shift in what the speakers are talking about, which may be a new aspect, or part of a topic, or a complete change in topic. The monologue is defined as a solo performance of a speaker addressing a group. Eventually, after much additional work, these units were modified and given new names, ventures and moves (Smith et al.,1967). A venture is a segment of discourse consisting of a set of utterances dealing with a single topic and having a single overarching content objective. It is determined by a complete change in topic and may be between two or more

persons or may contain the discourse of only one speaker. A move is the logical relationship between some event, object, or thing, and some term in the proposition (used in the logical sense) disclosed by the venture in which the discourse occurs.

Taba (1964) has chosen the thought unit for investigation and has defined this as a remark or series of remarks expressing a complete idea, serving a specific function, and having a particular level of thought. By careful analysis of verbal transactions in a classroom, she and her staff were able to identify four types of teacher-pupil interactions which were productive in the sense that they resulted in high level thought responses from the pupils. These recurring sequences were called teaching modules. Taba's module and Smith's venture differ only in Taba's specification that a high thought level response must take place during the interchange.

Bellack, Kliebard, Hyman, and F.L.Smith (1966) have investigated classroom work in a naturalistic manner and have classed statements, each having a different function in discourse, in terms of four pedagogical moves, structuring, soliciting, responding, and reacting. By analyzing teaching behaviors in terms of these moves, they uncovered teaching cycles which occurred quite frequently in the course of a classroom period. It appears that a move (in Bellack's sense) could correspond to Smith's monologue or that a cycle could be either a venture or module. However, these terms describe a small piece of the total interaction picture, and none indicates how a particular goal is to be achieved.

The authors have developed a unit, called "the tactic" which can be used as a basis for conceptualizing teacher-pupil classroom interaction and for developing paradigms which depict such interaction. Further, it will be shown that this unit subsumes the aspects of interaction identified in other studies as the "move", "venture", "monologue", "episode", "incident", and "cycle". In order to understand the concept of "the tactic" certain terms need to be defined. These are as follows:

I. Cognitive Focus: A topic of classroom interaction having a single content or skill objective.

II. Move: Any discrete verbal utterance.

III. Types of moves. (The numbers in parenthesis after each move correspond to conventions given in Reynolds, Abraham and Nelson (1970). This paper also gives definitions for these moves.)

A. Structuring Moves
   1. Reviewing (0)
   2. Informing (1)
   3. Directing (2)

B. Soliciting Moves
   1. Recalling (3)
   2. Collecting Data (4)
   3. Processing Data (5)
   4. Evaluating or Verifying Principles and/or Conclusions (6)

C. Reacting Moves
   1. Accepting (7)
   2. Rejecting (8)
   3. Calling for Clarification (9)
   4. Calling for Evidence or Explanations (10)
   5. Calling for the Opinions of Another Person (11)
   6. Repeating the Question or Response (R)
   7. Answering a Students Raised Hand (N)

D. Responding Moves
   1. Recalling (3')
   2. Presenting Data (4')
   3. Processing Data (5')
   4. Evaluating or Verifying Data (6')
   5. Answering "I don't know" (K)

IV. Tactic: A series of verbal behaviors in two modes:

A. The Non-Interactive which begins and continues with Structuring Moves serving to establish and/or maintain a center of cognitive focus. This type of tactic ends at the initiation of a Soliciting Move; and

B. The Interactive which begins with a Soliciting Move(s), establishing or maintaining a cognitive focus, and running through Reacting and/or Responding Move(s), all maintaining the established cognitive focus. This type of tactic ends with the initiation of Structuring or Soliciting Move which establishes a new cognitive focus.

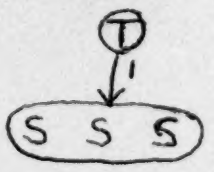
V. Strategy: Any combination of tactics leading to the achievement of a teacher stated behavioral objective(s).

Classroom interaction such as lecture, teacher-centered discussion, pupil-centered discussion can be detected and isolated as tactics. The tactics presented in the following descriptions are taken from classroom research. They conceptualize teacher-pupil interchanges which achieve an instructional goal prestated by the teacher. Of primary interest are tactics which elicit verbal responses indicative of high level thought processes and which may lead to the learning of cognitive skills, but tactics will be suggested which, from research findings, hint at attainment of other types of instructional goals.

Non-Interactive Tactics

One of the most fundamental non-interactive tactics a teacher uses is the lecture. A paradigm depicting it is illustrated in Figure 1.

Figure 1
Non-Interactive Tactic: Teacher Lecturing



This paradigm is drawn according to several rules.

1. The initiator of the tactic is drawn at the top of the paradigm; this can be either the teacher (T) or the student (S).

2. The arrow indicates the direction of the verbal transaction. In this case, the teacher is doing all the talking.

3. The number to the right of the arrow indicates the move being made, corresponding to the definitions given above. In this case the move is Informing.

4. At most, four persons are shown in the paradigm; however, this does not mean that only <u>four</u> were involved, it means that four or more were involved.

Other non-interactive tactics may be 1) a review given by one person, a move given the number 0; 2) a person giving directions to the class on how to do something, a move given by number 2. This tactic represents the

a. Structuring move as observed by Bellack, et al. (1966) and is a teaching cycle

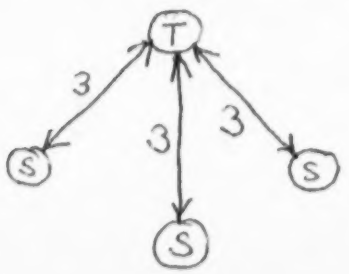
b. Monologue as defined by Smith and Meux (1962) and Smith et al. (1967)

c. Category of teacher talk defined as a lecture or giving directions by Flanders (1964B) and modified Flanders' systems and described as having a direct influence on pupil behavior.

<u>Interactive Tactics</u>

Most other verbal classroom behavior can be accounted for by assuming an interactive mode. One tactic used quite extensively is the recitation. During the recitation, the teacher asks questions pertaining to material assigned for student reading and requiring the student to recall an answer. A paradigm for this tactic is illustrated in Figure 2.

Figure 2
Interactive Tactic: Teacher Asking
Recall Questions, Students Responding



One additional rule has been used in drawing this paradigm.

5. The double ended arrows indicate a question-answer mode with the questioner shown at the top of the model as the initiator of the tactic. The number next to the arrow indicates the type of move; in this case 3 represents a recall question being asked and answered.

If essentially the same question is asked of several students, this tactic is one which Taba (1965) defines as extending thought on the same level. It fulfills the requirement of allowing a sufficient amount of assimilation before thought is lifted to another higher level. She also notes that this type of questioning assures participation in the next higher step.

During a recitation the questioner may react to a response in five ways:

a. Ignore the response (Category 12)

b. Place a judgement on the responses - right or wrong (Category 7 or 8)

c. Require the respondent to clarify his response (Category 9)

d. Require the respondent to expand or defend his response (Category 10)

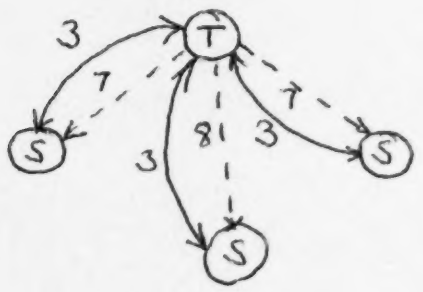
e. Ask another person to evaluate the response

Such reacting behaviors are dealt with in drawing the paradigms according to the following rule:

6. The reaction to a Responding move is depicted on the paradigm by a dashed arrow. The number next to the arrow corresponds to the type of reaction move.

Thus, a recitation tactic with accepting and rejecting reaction moves can be depicted as illustrated in Figure 3.

Figure 3
Interactive Tactic: Teacher Asking Questions, Students Responding, Teacher Reacting to Response



On the basis of the foregoing, the following comparisom can be made:

a. This is an example of Smith's venture (1967)

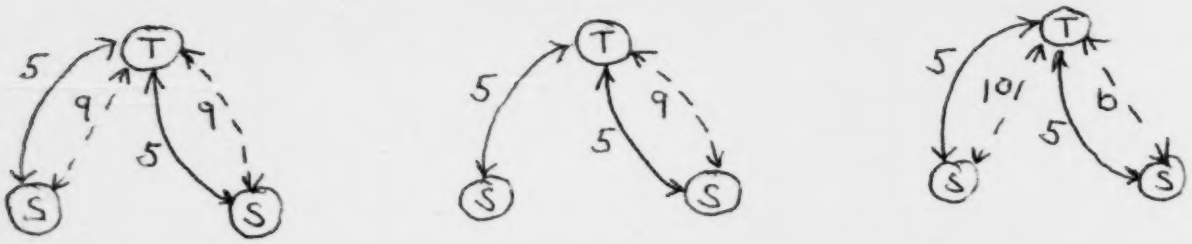
b. This corresponds to Bellack et al's (1966) teaching cycle represented by Soliciting, Responding, Reacting.

c. This is an example of Flander's (1964A) teacher-directed quick drill.

d. This does not include an example of high level thought; therefore, it cannot be called a module. (Taba, 1964)

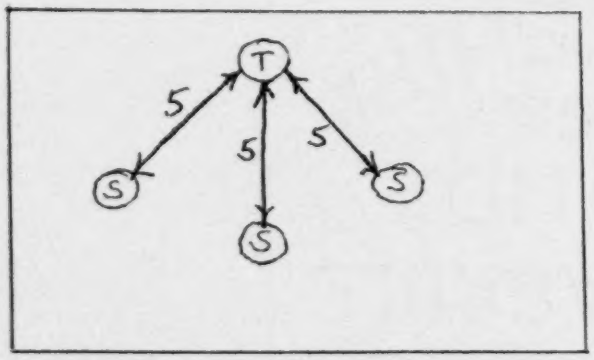
Using a modification of the previous tactic, all of Taba's (1967) teaching modules can be represented as illustrated in Figure 4. Moves labeled 5 represent data processing type questions, those labeled 9 and 10 represent clarifying and calling for evidence respectively.

Figure 4
Teaching Modules identified by Taba (1967)

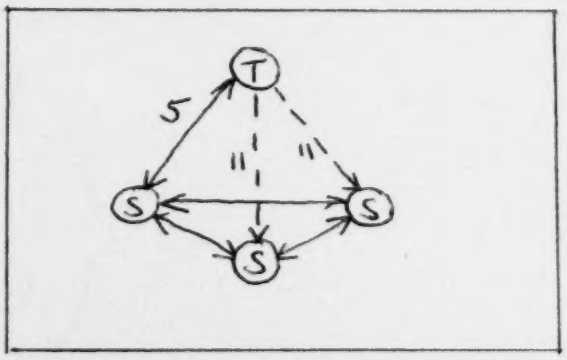


For the most part these tactics are teacher initiated, centered, and directed, but it is essential that the pupil engaged in problem solving be able to compare his explanation to those given by peers and be able to analyze and react to peer responses. Palmer (1965) has suggested that these are ways to build cognitive conflicts in the classroom. These conflicts are the first steps in conceptual reorganization. Two tactics designed to do this are illustrated in Figure 5.

Figure 5
Two Tactics Which Build Cognitive
Conflicts in the Classroom



Cognitive focus: The explanation of a chemical demonstration performed by the teacher. (Permits comparisons of student explanations)



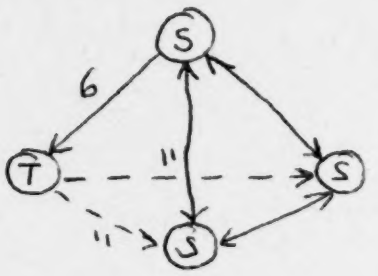
Cognitive Focus: The evaluation of an explanation given by one student. (Permits peer interaction and analysis)

An actual classroom transcript illustrates the second tactic:

T: How are these two demonstrations alike?
S1: Both of them use fire.
T: Do you agree with that, Tom?
S2: No, I think that the common element is heat.
S1: But fire produces heat.
T: What do you think, Mary?
S3: Well, you can have heat without fire, so Tom's answer is more appropriate than Larry's.

As is illustrated in Figure 6, the same idea can be used when a student initiates a tactic.

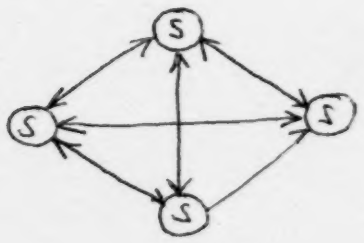
Figure 6
A Student Initiated Tactic



S1: How could you show that hot water freezes faster than cold water?
T: Fred, what do you say?
S2: Well, we could fill some ice cube trays with water, place them in a refrigerator, and record the temperature every five minutes.
T: Virginia, what do you think of that?
S3: It sounds O.K. to me except that we should make sure the amount of water in each tray is the same before we begin.
S2: Yes, and at the same initial temperature, too.

The two tactics illustrated in Figure 5 are ways to stimulate classroom interaction and if used often may lead to the students responding to each other in a critical manner without teacher intervention. One possibility for such an interchange is illustrated in Figure 7.

Figure 7
A Student Discussion Tactic

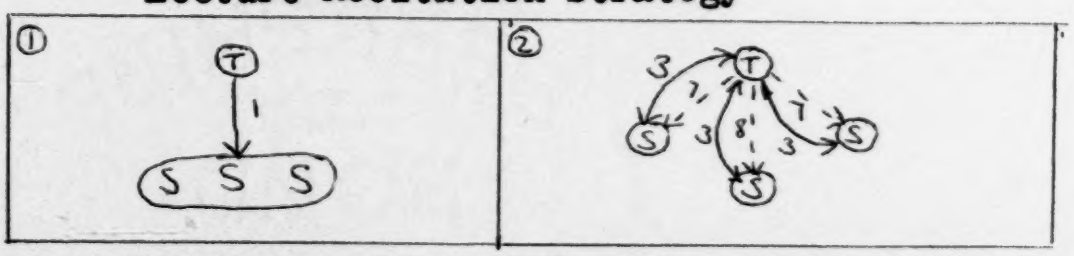


There are many more tactics a teacher uses in the classroom; the limitation of space does not permit their presentation here.

Strategies

During the development of a single classroom period of interaction, several tactics may be employed. Any combination of tactics leading to the achievement of a teacher-stated behavioral objective(s) will be designated as a strategy. These strategies can be presented in paradigm form. The lecture-recitation form is represented in Figure 8.

Figure 8
Lecture-Recitation Strategy



Cognitive Focus: Presentation and elaboration of the Ptolemy's geocentric model of the universe.

Cognitive Focus: Review of the major points of Ptolemy's geocentric model of the universe.

Objective: After listening to an explanation of Ptolemy's geocentric model of the universe, students should be able to describe at lease three of its major points.

The strategy shown was drawn according to the following two rules:

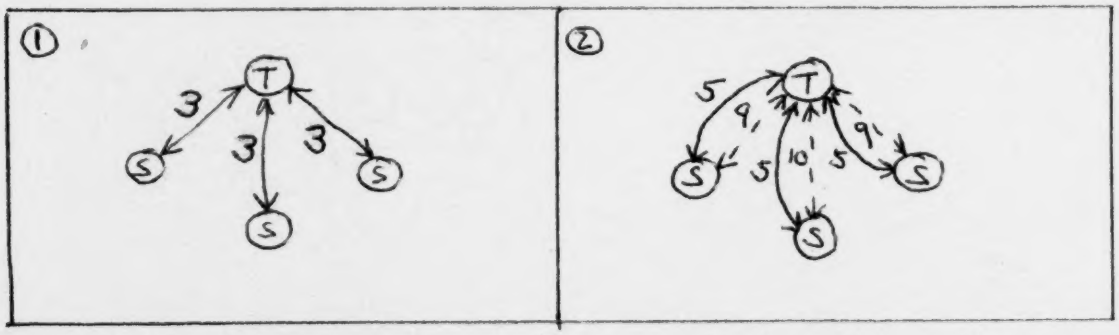
1. The order of the tactic is noted in the upper left hand corner of the square in which the tactic is represented.

2. The length in minutes of the tactic is noted in the upper right hand corner of the square in which the tactic is represented.

Depending on the thought level of the questions asked during the second part, this strategy could be designated as having high content emphasis under close supervision (Flanders, 1964A.)

Taba (1964) has found that if a teacher raises the thought level of a discussion too early, the students do not sustain high thought level responses, but rather quickly return to lower levels until the focus of the discussion has been changed. In addition, if the cognitive focus changes too frequently, similar results are produced. However, if the teacher extends thought and then gradually raises it, followed by extension at a higher level of thought, the discussion can be maintained at the high thought response level. Taba (1964) found that students of teachers who were trained to elicit high level responses were able to make better inferences and generalizations than students of teachers who were not so trained. A possible strategy for accomplishing this is depicted in Figure 9.

Figure 9
A Strategy to Maintain High Thought Responses

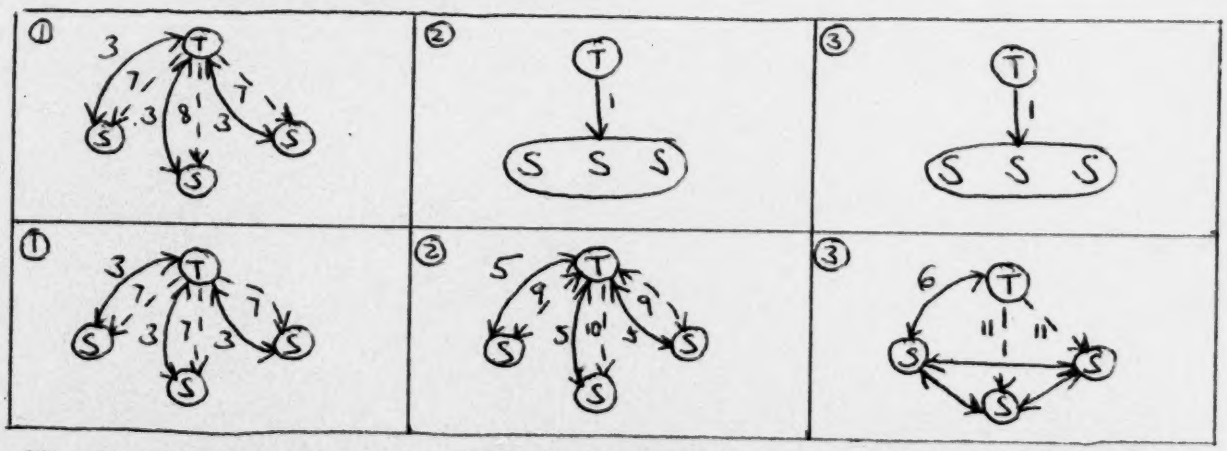


Cognitive Focus: What did you notice about the mealworms behavior when bran was placed in his box? (Extending thought)

Cognitive Focus: How could you find out if the mealworm was hungry? (Lifting and extending thought)

Recently, Abraham, Nelson and Reynolds (1970) tested two discussion strategies and their effects on children's ability to make observations, inferences, verifications, classifications, and the learning of some science principles. The two discussion strategies are depicted in Figure 10.

Figure 10
Two Discussion Strategies
Experimentally Tested



Cognitive Focus	What observations did you make?	What inferences can you draw?	What test of that inference can you devise?

On the basis of this study the authors found the first to be most effective in helping students learn science principles and the second to be most effective in helping students to

make more observations and inferences.

Implications

What has been demonstrated here is a way of conceptualizing classroom verbal interaction. Models and rules for developing the models have been presented. The usefulness of the models is quite apparent. A single paradigm can consolidate a solid page of transcription or fifteen mimutes of audiotape recording. The three authors have used these models in teacher training to transmit to apprentice teachers the various types of verbal tactics available. These models have been role-played in the classroom and then conceptually presented. In addition the authors have built discussion strategies from theory, conceptualized them using these models, and researched them. If these models are properly researched, a teaching strategy map can be developed which gives a teacher an indication of the type of verbal strategies to use when achieving specific instructional objectives.

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